RESEARCH SUMMARY

forest sciences
NELSON FOREST REGION

December 1997 RS-034

CASE STUDY: Cable Harvesting a Strip Clearcut on Steep Slopes in an Old-Growth Interior Cedar Hemlock Forest

By Lauren Waters

- **Strip clearcutting a steep slope with downhill cable yarding is feasible.**
- **Site objectives should be met.**

INTRODUCTION

Due to increasing pressures on the landbase to accommodate various resource values, the Revelstoke Forest District has considerable interest in trying alternative cable-harvesting techniques.

In the summer of 1996, for the first time in this District, cable harvesting was used on a strip clearcut. Working under the Small Business Program, a contractor conducted this operational trial in the Bigmouth Valley (Figure 1).

The site-specific objectives of the trial were to:

1. Address natural regeneration difficulties on a site with potential growth-limiting factors: very high coarse fragment content; rocky talus slopes; and a steep, south-facing slope.
2. Harvest overmature Hw, Cw, (Fdi, Pw, Sx), with natural regeneration on a 100-year rotation. (Anticipated merchantable volume = 196 m³/ha.)
3. Maintain 50% of the site in forest cover to provide a seed source for natural regeneration and to shelter adjacent regeneration.

A strip clearcut may help meet other objectives such as: achieve biodiversity seral stage targets, retain old-growth habitat for mountain caribou, retain wildlife trees, and maintain visuals for tourism values.

SITE DESCRIPTION

This site is located approximately 120 km north of Revelstoke, BC at Kilometre 24.5 on the Bigmouth Forest Service Road. The block is a steep (75%) south-facing slope located in the Interior Cedar Hemlock - very wet, cool (ICHvk1) biogeoclimatic subzone. It has a very high coarse fragment content (85%), numerous rocky outcrops, and is characterized by a significant amount of moss on rock. The site series ranges from submesic to xeric. The merchantable volume is approximately 530 m³/ha, and the timber type is predominately overmature Hw36, Cw36, Sw25, Fdi2, Bl1.

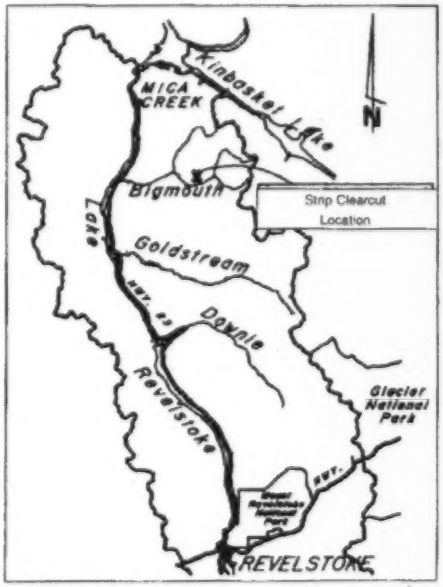

Figure 1. Location of study site.

PRESCRIPTION DEVELOPMENT

After a Silviculture Prescription field review was done in 1991, concerns were expressed about reforestation failure occurring due to the site's extreme rockiness and south aspect. A "pre-harvest" plantability survey was therefore conducted to determine if the site could be adequately reforested by planting.

The results of the survey indicated only 438 plantable spots/ha (assessed @ M=10, 2.4-m target spacing, and 1.4-m minimum intertree spacing). However, the number of post-harvest plantable spots is expected to decline because a fine fuel slash loading will occur as a result of a significant component of Hw, and Cw advanced regeneration. Also, the initial mortality of planted stock is anticipated to be high due to desiccation and damage by small mammals associated with rocky areas.

Based on the survey results, it was concluded that planting would be very difficult and expensive, and the chance of failure would be high. Therefore it was decided to try a harvesting system that would maximize the potential for natural regeneration, i.e. strip clearcutting by cable harvesting.

According to the Nelson Regional Guidelines, the minimum stocking standard (MSS) for this site series should be 700 seedlings/ha, and the target stocking standard (TSS) 1200 seedlings/ha. Based on the results of the plantability survey, a more realistic stocking standard was set for this site: MSS = 300 seedlings/ha, and TSS = 600 seedlings/ha. An extended regeneration delay of 10 years was set to allow sufficient time for natural regeneration to fill in the 60-m wide (two-tree-length) strips.

Numerous runs of Table Interpolation Program for Stand Yields (TIPSY) were completed to compare the anticipated stocking for this site (400 seedlings/ha) with a fully stocked stand (1200 seedlings/ha) at regen delay. The results indicated over 200 m^3/ha less on the poorly stocked site, as well as a longer rotation, i.e. 160 years based on mean annual increment. A 100-year rotation was set, based on the predicted pathological rotation for Hw and the annual allowable cut calculation assumptions. The anticipated volume for the site is 196 m^3/ha @ 100 years. But, based on the cruised volume for this site, it is likely that, given sufficient time (200-400 years), this site can produce a much larger volume (530 m^3/ha).

If more than 40% of a leave strip blows down, the prescription states that the strip will be harvested.

PLANNING AND LAYOUT

The block was originally laid out as a clearcut in 1991. This block was engineered for downhill yarding because the area above the block is inoperable, and the road is along the valley bottom. Because it is very difficult to conduct selective harvesting when downhill yarding old-growth stands on steep slopes, it was decided to use a strip clearcut in an effort to address the regeneration concerns.

The gross block area is 13.3 ha (Figure 2). TU 1 consists of four 60-m-wide strips totalling 5.9 ha which were harvested in 1996 (Figure 3). TU 2 consists of five 60-m-wide leave strips which will provide an adjacent seed source for natural regeneration, and some shelter/shade for this south-facing rocky slope. The leave strips (TU 2) are planned for harvesting 50 years after TU 1. This will ensure that the regeneration in the strips (TU 1) will grow to approximately 18-m tall and will provide a seed source for TU 2. Depending on the regeneration success of TU 1, this prescription may be modified.

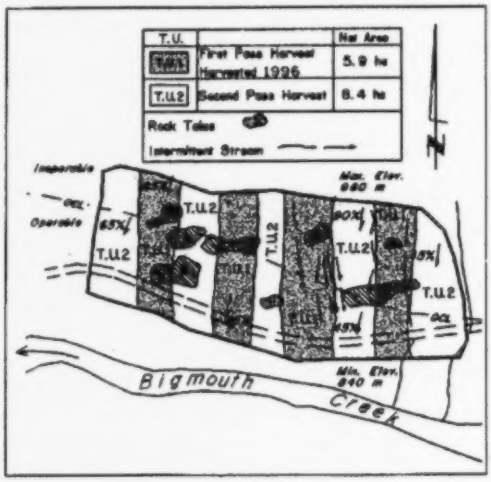

Figure 2. Block layout.

HARVESTING

The site was harvested over a four-week period in the summer of 1996, with production of approximately 140 m^3/day. The six-person crew consisted of two in the bush, a loader operator, a yarder engineer, a chaser, and a bucker. The crew did not experience any extra difficulties with harvesting this block as opposed to working on a larger clearcut.

Each strip was flagged, painted, and traversed, and the pre-planned landing locations were marked in the field. The original intention was to forward the wood along the main road to two landings. Instead, the logging crew was able to set up the Washington 88 swing yarder just off the road, and the logs were yarded to roadside and processed at the bottom of each strip. This eliminated the need to build landings, and reduced damage to the road surface.

PLANTING

The original prescription stated that the site should be monitored at 4 and 7 years to determine if the site is regenerating naturally. If regeneration is insufficient at year 7, then the strips would be fill planted. However, since the prescription was written, the MOF decided to plant the site with Fdi_{50}, Pl30, Cw12, Sx_6, PSB 415, and 415's because extra stock was available. Planting density was 697 stems/ha with more seedlings planted at the bottom of the slope where it is not as rocky. Planting was difficult, and problems were encountered due to poor

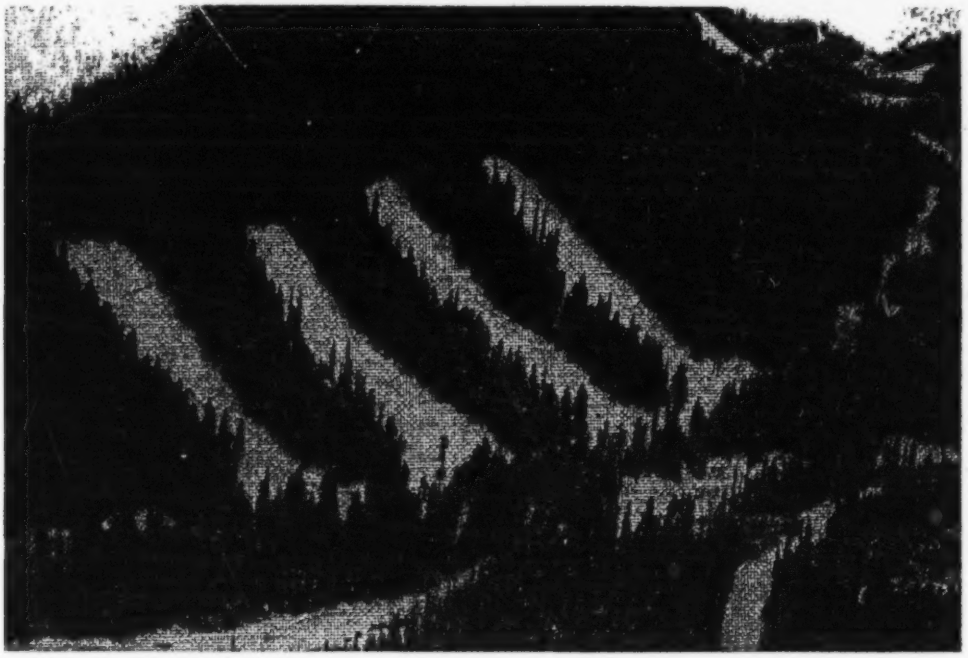

Figure 3. Harvested strips and leave strips.

microsite selection. A regeneration survey is planned for 1999 to monitor the plantation success and any ingress of naturals.

SUMMARY

An old-growth Interior Cedar Hemlock forest on a steep south-facing slope was strip clearcut by downhill cable yarding in the summer of 1996. Although cable harvesting in these conditions had not been used before in the Revelstoke District, this trial proved it to be operationally feasible. The intent of the prescription was to provide shade and a seed source to ensure regeneration success.

The objectives for this site should be met by this silviculture system; however, further monitoring will be required to determine if this prescription is also successful in terms of regeneration.

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